

REMARKS

Claims 1-11 are pending in this application. By this Amendment, claims 1-11 are amended to address informalities. No new matter is added by the above amendment. In view of at least the following, reconsideration and allowance are respectfully requested.

I. Claim Rejection under 35 U.S.C. § 112

The Office Action rejects claim 1 under 35 U.S.C. § 112, second paragraph. These rejections are respectfully traversed.

Although Applicants respectfully submit that former claim 1 satisfied the requirements of § 112, second paragraph, in an effort to expedite prosecution, claim 1 is amended to clarify the presently claimed combination of features.

Accordingly, withdrawal of the rejection is respectfully requested.

II. Claim Rejections under 35 U.S.C. § 103

The Office Action rejects claims 1, 4 and 5 under 35 U.S.C. § 103(a) over JP 2002-084037 (Tatsuya); and rejects claims 1, 4 and 5 under 35 U.S.C. § 103(a) over U.S. Patent No. 5,711,200 (Scherr). These rejections are respectfully traversed.

It is well settled that in determining the differences between the prior art and the claims, the question under 35 U.S.C. § 103 is not whether the differences themselves would have been obvious, but whether the claimed invention as a whole would have been obvious. *See* MPEP § 2141.02. To this end, a prior art reference must be considered in its entirety, i.e., as a whole, including portions that would lead away from the claimed invention. *See* MPEP § 2141.02 VI.

Independent claim 1 recites, in part, "a plane shape of each modified refractive index area is a polygon whose corners are removed."

MPEP § 2114 states that while features of an apparatus may be recited either structurally or functionally, claims directed to an apparatus must be distinguished from the

prior art in terms of structure rather than function. The Office Action asserts that the recitation that "a plane shape of each modified refractive index area is a polygon whose corners are removed" is merely functional. Applicants disagree. The fact that the refractive index areas are of polygon shapes with its corners removed is clearly a structural limitation - that is the limitation defines the structure of the presently claimed apparatus. Contrarily, as defined in MPEP § 2173.05(g), a functional limitation is an attempt to define something by **what it does, rather than by what it is**. As discussed below, the structural limitation of removing the corners of the polygon-shaped modified refractive index area has some functional benefits, however, these benefits are not recited in the claims. Accordingly, the Applicants respectfully submit that patentable weight must be given to the above-identified feature.

The presently claimed combination of features disclose a two-dimensional photonic crystal in which modified refractive index areas are cyclically arranged in a slab-shaped body. Accordingly, Applicants respectfully submit that there is a structural difference between the presently claimed combination of features and the crystal disclosed in Tatsuya. For example, paragraph [0031] of Tatsuya discloses "a [photonic] crystal with carrying out two-dimensional array of the above-identified zinc-oxide column, and constituting it on a base. A [photonic] nick crystal consists of structures where the part where two or more kinds of refractive indexes (dielectric constant) differ was made to arrange periodically." The zinc-oxide columns (i.e., pillars) correspond to modified refractive index areas, and the base corresponds to a slab-shaped body.

In a two-dimensional photonic crystal having a feature that modified refractive index areas are cyclically arranged in a slab-shaped body, as each of the modified refractive index areas become larger, neighboring modified index areas come in contact with each other. In these instances, the strength of the slab shaped body is weakened. The problem associated with neighboring modified refractive index areas being in contact with one another can be

avoided by the presently claimed combination of features. According to the presently claimed combination of features, the corners of the polygon are removed so as to ensure an adequate width of the connecting portion of the slab-shaped body between a corner of the modified refractive index area and that of the neighboring modified refractive index area. This design also enables to increase the total areas of the modified refractive index areas while maintaining the strength of a two-dimensional photonic crystal at a practically required level by bulging each modified refractive index area except at the corners. It is thus possible to widen the absolute photonic band gap (PBG) and thereby provide a broader wavelength band available for an optical element or other device than in the case where corners are not removed from the refractive index areas. *See* paragraph [0016] of the specification.

In Tatsuya, zinc oxide pillars (i.e., modified refractive index areas) stand on a base (i.e., a slab-shaped body), so that the strength of the base (body) cannot be deteriorated even if the area of every zinc oxide pillar (i.e., modified refractive index areas) grows and comes in contact with each other. Therefore, one of ordinary skill in the art would not refer to the teachings of Tatsuya. Consequently, the presently claimed combination of features are not rendered obvious by Tatsuya.

With respect to Scherr, Scherr discloses a two-dimensional photonic crystal having circular refractive index areas. *See* Scherr, Figs. 2-4, 6, 7, and 18-21. Because a circle is commonly known to not have corners, a circle does not fall within the classification of a polygon. As such, a circular refractive index area is substantially different from the polygon refractive index areas presently claimed in independent claim 1. Because Scherr therefore does not teach, disclose or render obvious a refractive index area being a polygon whose corners are removed, Scherr does not disclose or render obvious the presently claimed invention.

Tatsuya and Scherr, in any combination, do not teach, disclose or render obvious "a plane shape of each modified refractive index area is a polygon whose corners are removed." Therefore, Tatsuya and Scherr, either individually or in combination, do not disclose or render obvious the subject matter recited in claim 1.

Claims 4 and 5 variously depend from claim 1. Because the applied references, in any combination, fail to render the subject matter of independent claim 1 obvious, dependent claims 4 and 5 are patentable for at least the reasons that claim 1 is patentable, as well as for the additional features they recite.

Accordingly, withdrawal of the rejections is respectfully requested.

III. Rejoinder

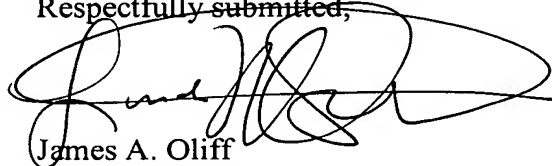
Pursuant to MPEP § 821.04, if the non-elected claims otherwise require all the limitations of an allowable claim, rejoinder of non-elected claims that include all the limitations of allowed product claims is permitted. Accordingly, upon allowance of claim 1, rejoinder of claims 2, 3, and 6-11 is respectfully requested.

IV. Conclusion

In view of the foregoing, it is respectfully submitted that this application is in condition for allowance. Favorable reconsideration and prompt allowance of the claims are earnestly solicited.

Should the Examiner believe that anything further would be desirable in order to place this application in even better condition for allowance, the Examiner is invited to contact the undersigned at the telephone number set forth below.

Respectfully submitted,



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Attachment:
Petition for Extension of Time

Date: August 21, 2008

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